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tyla—horses, titanotheres, rhinoceroses; the Artiodactyla—swine, camels, deer; the Proboscidea; and of the primitive ungulates, the Amblypoda and Condylarthra. There follow a number of chapters devoted to the peculiar South American ungulates, on which Professor Scott is so pronounced an authority, and these give place to a discussion of the carnivores, primates, edentates and marsupials.

Chapter XVIII. is philosophical, in that it expresses very clearly Doctor Scott's ideas concerning the modes of mammalian evolution. He states in explanation of the variations found between the "family trees" that "It is quite impracticable to construct a genetic series without making certain assumptions as to the manner in which the developmental processes operated and the kinds of modification that actually did occur," and the facts upon which these assumptions are based are ascertained by several distinct methods. Of these the oldest is comparative anatomy, an accurate knowledge of which is indispensable to the use of the others. The second is that of embryology, for, while Haeckel's famous biogenetic law, wherein the life history of the individual is supposed to give a résumé of that of the race, is proved not to be implicitly trustworthy for the interpretation of structural features, nevertheless the information attained through study of the embryonic stages is of the greatest service in the solution of zoological problems.

The third method, experimental zoology, especially that part known as genetics, has also taught us much; but the fourth, paleontology, despite the imperfection of the record due to the irretrievable loss of much of the past history of life, nevertheless has the pre-eminent advantage of offering to the student the actual stages of development, as it preserves the original documents and in the true order of succession.

In summation, Professor Scott remarks: "It is only too clear that the principles as to the modes of mammalian development which can be deduced from the history of the various groups must, for the most part, be stated in a cautious and tentative manner, so

as not to give an undue appearance of certainty to preliminary conclusions, which should be held as subject to revision with the advance of knowledge. Much has, however, been already learned, and there is every reason to hope that experimental zoology and paleontology, by combining their resources, will eventually shed full light upon a subject of such exceptional difficulty" (p. 663). A full glossary completes the volume.

The illustrations are in part from photographs of living mammals and clear anatomical drawings of certain essential skeletal features, but what will interest the general reader most are the admirably drawn reconstructions of extinct forms done by R. Bruce Horsfall under the careful supervision of Professor Scott. There are also others by Charles R. Knight, whose work always has a realism which no other artist of the prehistoric has ever attained.

In the production of this work Professor Scott has done a lasting service to the serious student of paleontology, as well as to the lay reader, and it is to be hoped that the admirably conceived and executed volume will have the appreciation it deserves.

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The Hill Folk. Report on a Rural Community of Hereditary Defectives. By FLORENCE H. DANIELSON, M.A., and CHARLES B. DAVENPORT. Eugenics Record Office. Memoir No. 1.

As explained in the preface, this is the first of a projected series which is intended to embody some of the more extended research of the Record Office. Dr. Davenport calls attention to the fact of its primary value to sociologists rather than to students of inheritance traits—which latter will require much more extended study, which, we are assured, will come later.

This Hill Folk study began with pedigrees of some of the inmates of the Monson State Hospital at Palmer, Mass., and extended to a town of 2,000 inhabitants in a fertile valley on a railroad between prosperous cities. The town is frequented by tourists who about

double the population during the summer. A lime kiln and a stone quarry represent the only industries outside of prosperous farming, that are followed. The Hill Folk descended from two men, a shiftless basket maker, known here as Neil Rasp, and an Englishman, owner of a small farm, both of whom came to the settlement about the year 1800. Their descendants have "sifted through the town and beyond it. Everywhere they have made desolate, alcoholic homes which have furnished state wards for over fifty years, and have required town aid for a longer time."

After an explanation of the charts—which are printed in the circular form with lines of descent radiating from the center and oldest generation—and a general survey of the strains involved and their traits, the following topics indicate the methods of study followed, viz., (a) inheritance, (b) marriage selection, (c) financial burden entailed by criminals and dependents (with a comparison with the Jukes), (d) survey of the present school children and (e) heredity and environment. An appendix takes up a detailed history of the separate families and certain individuals and their characteristics. The usual conventional symbols (American) are employed, though an apparently successful effort has been made to distinguish two degrees of mental deficiency and to indicate the same by the symbols. The members of the higher group, which are indicated by the letter "F" on white background, are able to support themselves in an inefficient "meager way," but "lack ambition, self control, common sense and the ordinary mental and moral capacity for differentiating between right and wrong." The individuals of the lower group, indicated by the symbol on a black background, are incapable of self support and "are a special menace to the community from their lack of all mental and moral stamina."

The symbol "Sx" is applied to the cases only where the "sex impulse works unhindered" from a lack of proper balance between the impulse and self control, as distinguished from those who only incidentally commit a sexually immoral act.

There is considerable data found in this study for comparing the effects of changes of environment.

An excellent lesson is derived from the study of one typical case showing the result of permitting marriage between and propagation of children by a pair of evident defectives. Of eleven children born from this union, all but two, that died in infancy, became public charges. Seven were known to be feeble-minded. Two of these and one of the infants that died early were epileptic.

An exceedingly interesting and instructive study is the survey of seventy-five school children from these families. Of these, school records were obtained in all but seven cases. From these the mental characteristics are noted. Thirty-eight are below the grade in which they should be in the schools, and in general they are either unable to fix attention upon one thing long enough to grasp it or require so much time to comprehend ideas that they progress very slowly. Usually they are "quiet, stupid laggards." The aggressive disturbers of social peace, though present, are the exceptions here.

This study of eight hundred and thirty-seven people has involved an immense amount of work on the part of the field worker, Miss Danielson, and has been subjected to a very searching and critical analysis by Dr. Davenport. It is full of interesting material for comparisons, some of which are discussed by the authors; as, for instance, the effects of dispersion of the feeble-minded groups; the attempt to approach the determination of unit mental characteristics; the ultimate cost of early segregation as compared with its neglect, etc.

The following is a brief summary of conclusions given.

"1. The analysis of the method of inheritance of feeble-mindedness shows that it can not be considered a unit character. It is evidently a complex of quantitatively and qualitatively varying factors most of which are negative, and are inherited as though due to the absence of unit characters.

"2. The value of out-marriage, exogamy, as a means of attenuating defective strains is

diminished by the action of social barriers and the natural preference of individuals, which induce marriages among like grades of mentality, in a foreign as well as a native locality.

"3. The amount of town aid which this one group of defective families requires decennially has increased 400 per cent. in the last thirty years. In the same length of time its criminal bill has been \$10,763.43 for sixteen persons; and the bill for its thirty children who were supported by the state during the last twenty-three years is \$45,888.57. During the past sixty years this community has, it is estimated, cost the state and the people half a million dollars.

"4. Half of the present number of school children from these families who are living at home show evidence of mental deficiency.

"5. One half of the state wards from the community in question have reacted favorably in an improved environment and give promise of becoming more or less useful citizens; the other half consist of institutional cases and those which have not reacted to the better environment, but are likely to become troublesome and dangerous citizens.

"6. The comparative cost of segregating one feeble-minded couple and that of maintaining their offspring shows, in the instance at hand, that the latter policy has been three times more expensive."

Valuable as are the deductions from such a piece of work as this, its greatest value lies in the number of facts collected and recorded, which will always be available for later comparisons in two ways, viz., with any subsequent information concerning the same people, and with collected facts concerning other families and settlement groups as they are being secured in different parts of the country.

A. C. ROGERS

The Microtome's Vade-mecum. A Handbook of the Methods of Microscopic Anatomy. By ARTHUR BOLLES LEE. Seventh edition. Philadelphia: P. Blakiston's Son & Co. Pp. x + 526. 1913.

The appearance of a new edition of this well-known handbook will be welcomed by

biologists, many of whom, like the reviewer, have doubtless awaited its appearance with some impatient anticipation. Although entitled a "Handbook of the Methods of Microscopic Anatomy," the field covered is broad, as there are included methods employed by embryologist, histologist, zoologist and botanist. The need the book aims to meet is thus not a simple one. The extensiveness of the field calls for a careful selection from a large mass of material, of standard methods of real value which need to be worked over and personally tested. This the author has in most instances done and hence the greater practical value of the book.

The present edition conforms to the previous one in arrangement, form of presentation and size—this last despite the addition of considerable new matter ("more than 700 new entries in the index"). Indeed, of the thirty-six chapters that make up the book the only ones which are increased in length are those on Embryological Methods (Ch. XXV.) and Nervous System; Cytological Methods (Ch. XXXIII.). The condensation has been secured by "cutting out superfluous matter, condensation of the text and typographical compression." The sections relating to neurofibrils and to blood and blood parasites the author states in the preface have been almost entirely rewritten. Of important additions to histological technique introduced since the previous edition, the author specifically mentions Gilson's mounting media, camsal balsam and euparal, which permit mounting direct from 95 per cent. alcohol, and also improvements in the Bielschowsky and Cajal silver methods.

As in the previous editions, the methods considered by the author more important are presented in larger type, those less important in small type. The references to the original articles are in all instances given and are, as far as the reviewer has tested them, exact.

It would not be difficult in a book of this kind whose excellence depends upon a rigorous selection and personal emphasis, for a worker to cite methods which might well have been included or which seem to merit more